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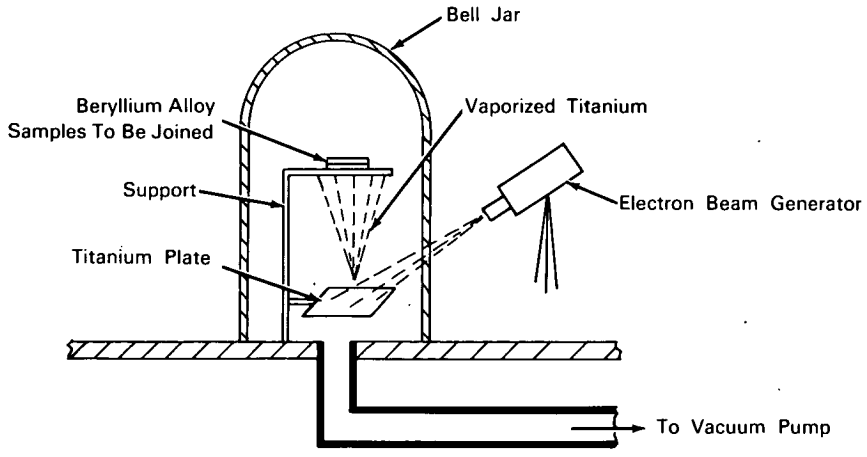
Brief 65-10153

NASA TECH BRIEF

Titanium Treatment Improves Brazed Joints



The problem: To promote good wetting and flow of filler metal or brazing alloys on metal surfaces to be joined by welding. Alloys with good wetting and flow characteristics improve metal joint capillarity during the brazing process and also yield a more homogeneous weld of greater strength.

The solution: Improve the wettability and flow of standard brazing alloys by pretreating the parent metal with a thin coating of pure titanium.

How it's done: Beryllium alloy samples are placed on a support in a bell jar and a sheet of pure titanium is placed in a holder below them. The bell jar is evacuated and an electron beam of three kilowatts power at 10,000 volts is directed to the titanium plate for about 5 minutes. This generates sufficient heat to puddle and vaporize the plate and a coating of pure titanium about two microns thick condenses on the beryllium alloy samples above.

The samples are then brazed by electron beam with a standard silver/lithium/copper brazing alloy. Metallurgical microphotographs of pretreated and nonpretreated brazed specimens showed improvement by pretreating of the wetting characteristics of the brazing alloy to a remarkable degree.

Notes:

1. The brazing process need not immediately follow the pretreatment process. Pretreated items have been stored for considerable periods and then brazed with no loss of weld quality.
2. This process could improve the quality of silver/copper/zinc/lithium brazing of carbide tips to tool shanks. It could also be used for brazing the chromium/nickel types of stainless steels.
3. The pretreatment could be used to advantage in the manufacture of aviation and aerospace components where high strength-to-weight ratios must be achieved.

(continued overleaf)

4. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Manned Spacecraft Center
P.O. Box 1537
Houston, Texas, 77001
Reference: B65-10153

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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